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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,317	04/26/2007	David Jones	4810-75994-01	4955

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EXAMINER	
MI, QIUWEN	

ART UNIT	PAPER NUMBER
1655	

MAIL DATE	DELIVERY MODE
11/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/582,317	JONES ET AL.	
	Examiner	Art Unit	
	Qiuwen Mi	1655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28,30-34,45-49 and 52-58* is/are pending in the application.

4a) Of the above claim(s) *25-28,30-34,45-49 and 52-58* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/8/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I, claims 1-24, and species *Thuja plicate*, methanol and dichloromethane, in the reply filed on 10/1/07, is acknowledged. The traversal is on the ground that it is not required that all claims have all technical features in common. As indicated in the previous office action, The inventions listed as Groups I-V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Groups III and VI do not contain polar components as Groups I, II and V do; Group III does not contain polar components as Groups I, II, VI, and V do; Group I-III and V do not contain solid plant materials as Group VI does, therefore, there is no special technical feature in the application. Accordingly the groups are not so linked as to form a single general concept under PCT Rule 13.1., and therefore lack of unity of invention exists.

The requirement is still deemed proper and is therefore made FINAL.

Claims Pending

Claims 1-28, 30-34, 45-49, and 52-58 are pending. Claims 29, 35-44, 50, 51, and 59-65 are cancelled. Claims 25-28, 30-34, 45-49, and 52-58 are withdrawn as they are directed toward a non-elected invention groups or species. Claims 1-24 are examined on the merits.

Claim Rejections –35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 8-15, and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al (U, Wood Science and Technology 34, 389-401, 2000), as evidenced by Johansson et al (V, Holzforgchung 54: 246-254, 2000).

Johansson et al (U, Wood Science and Technology 34, 389-401, 2000)teach methanol (polarity index 5.1) extractives from western red cedar (*Thuja plicata*) (plant order Cupressales) mechanical pulps and heartwood (trunk) (see Abstract). Johansson et al also teach that heartwood chips were cut into slivers (solid phase of extracted plant materials) to maximize solvent penetration (mixing the plant materials with a liquid polar solvent to form an extraction mixture), soxhlet procedure was used. The pulps were extracted for 20-22 hours, methanol solvent was removed under reduced pressure (a type of distillation) (separating pregnant polar solvent liquid phase from solid plant materials, form a concentrated polar phase), fractionation was performed

by suspending 0.5 g of the extractives in 200 ml of methyl tert-butyl ether (MTBE) (immiscible nonpolar solvent) (polarity index 2.5) with stirring for 48 h. The resulting brown solid was filtered off (solid phase separation)(see page 391, 1st paragraph). Johansson et al further teach that the extractive components of western red cedar heartwood contains (MTBE soluble components) lignans and tropolones (MTBE soluble components) (Table 4, page 398). Johansson et al also suggest that insoluble polymers formed from plicatic acid during refining.

Johansson et al (U, Wood Science and Technology 34, 389-401, 2000) do not teach the claimed extraction period, nor do Johansson et al explicitly teach extracting lignins from *Thuja plicata.*

As evidenced by Johansson et al (V, Holzforgchung 54: 246-254, 2000), the color of the extractable heartwood of *Thuja plicata* is primarily due to a lignin-lignan co-polymer, with the lignan present as a minor component (see page 246, right column, 1st paragraph). Thus it is inherent that lignins and tropolones in *Thuja plicata* will be extracted by methanol, and they will be soluble in the non-polar solvent. Also it is inherent that methanol will extract a proportion of the polar molecules and at least 50% of the tropolones in the plant materials; and partitioned polar solvent phase comprises plicatic acid.

Therefore it would have been *prima facie* obvious for one of ordinary skill in the art at the time the invention was made to use the claimed extraction period in the current invention as the result-effective adjustment in conventional working parameters is deemed merely a matter of judicious selection and routine optimization which is well within the purview of the skilled

artisan, which is dependent on the amount of the plant material, solvent and extracting temperature being used.

From the teachings of the references, it is apparent that one of the ordinary skills in the art would have had a reasonable expectation of success in producing the claimed invention.

Thus, the invention as a whole is *prima facie* obvious over the references, especially in the absence of evidence to the contrary.

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al (U, Wood Science and Technology 34, 389-401, 2000), in view of Delong et al (A*, US 4,966,650), further in view of Naae et al (B*, US 6,207,808), as evidenced by Johansson et al (V, Holzforgchung 54: 246-254, 2000).

Johansson et al (U, Wood Science and Technology 34, 389-401, 2000)teach methanol (polarity index 5.1) extractives from western red cedar (*Thuja plicata*) (plant order Cupressales) mechanical pulps and heartwood (trunk) (see Abstract). Johansson et al also teach that heartwood chips were cut into slivers (solid phase of extracted plant materials) to maximize solvent penetration (mixing the plant materials with a liquid polar solvent to form an extraction mixture), soxhlet procedure was used. The pulps were extracted fro 20-22 hours, methanol solvent was removed under reduced pressure (a type of distillation) (separating pregnant polar solvent liquid phase from solid plant materials) (form a concentrated polar phase), fractionation was performed by suspending 0.5 g of the extractives in 200 ml of methyl tert-butyl ether (immiscible nonpolar solvent) (polarity index 2.5) with stirring for 48 h. The resulting brown solid was filtered off

(solid phase separation (page 391, 1st paragraph). Johansson et al further teach that the extractive components of western red cedar heartwood contains (MTBE soluble components) lignans and tropolones (MTBE soluble components) (Table 4, page 398). Johansson et al also suggest that insoluble polymers formed from plicatic acid during refining.

Johansson et al (U, Wood Science and Technology 34, 389-401, 2000) do not teach using nonpolar solvent dichloromethane, the claimed extraction period, or additional wash of nonpolar solvent diethyl ether, nor do Johansson et al explicitly teach extracting lignins from *Thuja plicata.*

As evidenced by Johansson et al (V, Holzforgchung 54: 246-254, 2000), the color of the extractable heartwood of *Thuja plicata* is primarily due to a lignin-lignan co-polymer, with the lignan present as a minor component (page 246, right column, 1st paragraph). Thus it is inherent that lignins and tropolones in *Thuja plicata* will be extracted by methanol, and they will be soluble in the non-polar solvent. Also it is inherent that methanol will extract a proportion of the polar molecules and at least 50% of the tropolones in the plant materials; and partitioned polar solvent phase comprises plicatic acid.

Delong et al disclose a method for fractionation of lignins (see Title). Delong et al teach that the whole aqueous eluant is sent to a liquid-liquid extractor containing dichloromethane to remove the water-soluble lignin components (col 6, lines 40-45). Delong et al further teach that filtration and recovery by evaporation of the dichloromethane from the filtrate yields lignin D.

Naae et al disclose a method for preparation of lignin phenol surfactant (see Title). Naae et al teach that lignin phenol may be recovered from the reaction mixture with an organic solvent that is capable of solubilizing lignin phenol, such as diethyl either etc.

It would have been *prima facie* obvious for one of ordinary skill in the art at the time the invention was made to use dichloromethane to extract lignins of Delong et al in the current invention since Delong et al teach extracting lignin using dichloromethane; It would also have been *prima facie* obvious for one of ordinary skill in the art at the time the invention was made to use diethyl either to wash non-polar solvent phase in Naae et al in the current invention since Naae et al teach diethyl either is capable of solubilizing lignins. Since all the references cited yielded beneficial results in preparing lignins, one of ordinary skill in the art would have been motivated to make the modifications. In addition, it is well known in the art that dichloromethane, diethyl either, and methyl tert-butyl ether all have similar polarity index and are used interchangeably as non-polar solvents. Regarding the limitation to the extraction period, the result-effective adjustment in conventional working parameters is deemed merely a matter of judicious selection and routine optimization which is well within the purview of the skilled artisan, which is dependent on the amount of the plant material, solvent and extracting temperature being used.

From the teachings of the references, it is apparent that one of the ordinary skills in the art would have had a reasonable expectation of success in producing the claimed invention.

Thus, the invention as a whole is *prima facie* obvious over the references, especially in the absence of evidence to the contrary.

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qiuwen Mi whose telephone number is 571-272-5984. The examiner can normally be reached on 8 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terry McKelvey can be reached on 571-272-0775. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Qiuwen Mi

Michele C. Flood.

MICHELE FLOOD
PRIMARY EXAMINER